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3p.

SIXTH MONTHLY PROGRESS REPORT ON  
DEVELOPMENT AND TESTING OF ELECTROLYTE  
MATRIX COMBINATIONS FOR  
MERCURY-POTASSIUM FUEL CELL

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Sixth Monthly Progress Report

OTIS  
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(NASA CONTRACT NASw-476)

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## PROGRESS OF WORK DURING THIS REPORTING PERIOD

This is a brief report of significant progress during this report period. The Second Quarterly Progress Report is being prepared. Progress to date does not significantly change the time-phased diagram shown in Figure 1 of the Fifth Monthly Report, Allison EDR 3360.

The significant progress this period is as follows:

- A critical review of the procedures for the preparation of the composite was made, but final proposals for the redirection of the program are not complete.
- Strength testing of the coarse grain composite is complete, and evaluation of the total data is in progress. Conductivity work is not complete.
- Strength testing of the new 63% fine grain composite is complete, but conductivity work is lagging.
- Two 2-in. x 1/8-in. disks have been prepared for small cell tests—a 34% and 63% composite. The possibility of fabricating a cell matrix of the fine grain, which will not crack, looks promising; however, tests have shown this material to be weak at cell temperature.
- Compatibility tests of a 63% composite indicated that the material will not support itself, i. e., will run from the harness prior to immersion into the test pool.
- Results from compatibility tests of the new 34% coarse grain composite are encouraging. This material withstood an 18-hr test. Analysis of the disk is in progress.

## WORK FOR NEXT REPORTING PERIOD

The following items will receive attention during the next report period.

- An effort to clean up all steps in the fabrication procedure to eliminate moisture and/or gas will be made.
- Composite matrix specimens will be tested for compatibility with the liquid metals, and for mechanical strength under operating conditions in an effort to find an improved composite.



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- Small cell tests of 2-in. x 1/8-in. disks will be made as the improved composites become available.

#### CUMULATIVE MAN MONTHS EXPENDED

RESEARCH — 18.2 Man Months

SHOP — 0.5 Man Months

MATERIALS LABORATORY — 10.9 Man Months

#### ORIGINAL BUDGET (CORRECTED)

- Research — 35 Man Months
- Shop — 2.0 Man Months
- Materials Laboratory — 12.0 Man Months